

A Clinical Prospective and Comparative Study of Colposcopy with Endocervical Brush and Pap Smear with Ayre's Spatula for the Detection of Cervical Premalignant Lesions

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Abstract

Background: Precursor lesions, from which cervical cancer originates, must be found as soon as possible. The most crucial screening tests, such as the PAP smear and colposcopy, are used to find precancerous lesions. This study compares colposcopy with papanicolaou (pap) smear for the early diagnosis of cervix premalignant lesions.

Methods: From September 2022 to February 2023, a prospective clinical trial was carried out in the Obstetrics and Gynaecology Department at JLNMCH in Bhagalpur, Bihar, in collaboration with the Department of Pathology. 200 symptomatic, sexually active women between the ages of 20 and 60 were chosen for the study. To confirm the diagnosis, every woman underwent a cervical biopsy, colposcopy, and pap test.

Results: 48 (48.87%) of the 98 people whose pap smears tested positive were real positives and 50 (51.02%) were false positives. 90 (88.24%) of the 102 negative pap smear results were real negatives, whereas 12 (11.76%) were false negatives. Histopathology and colposcopic results were favourable in 60 (30%) of the women. 60 (30%) of the women had positive colposcopic features but negative histology, while 80 (40%) of the women had normal colposcopy with negative histopathology. 38 women (19%) who had negative cytology results had positive colposcopy and histopathology results.

Conclusion: Colposcopy sensitivity and specificity were 100 and 57.14%, respectively, and its positive predictive value and negative predictive value were found to be 50 and 100%. In contrast, Pap smears had a sensitivity of 80% and a specificity of 64.29%, with a positive predictive value of 48.98% and a negative predictive value of 88.24%.

Keywords: Pap smear, Colposcopy, Premalignant lesions of cervix.

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Introduction

The most typical location for female genital cancer is the cervix. According to the Indian Council of Medical Research (ICMR), the incidence of cervical cancer among women between the ages of 35 and 64 in India is from 20 to 35 per 100,000, but it is just 1 to 8 per 100,000 in developed nations. Each year, 132,000 new cases of cervical cancer are reported in India, and 74,000 people die from the disease. This means that a woman passes away from the disease every 7 minutes.[1] If nothing is done, it is anticipated that the numbers will quadruple by 2020.[2]

Only 5% of women in these nations have ever had a cervical cancer screening, despite the fact that more than 80% of instances of the disease occur there.[3]

For the quick, painless, non-invasive, and accurate identification of precancerous, cancerous, and non-malignant alterations in the cervix and vagina, use the papanicolaou (PAP) smear.[4]

In India's rural villages, where 58% of women are illiterate, the health system is subpar, and cervical cytology is unknown, it is impossible to implement centralised cervical cytology screening programmes.

The incidence of cervical cancer was reported to have decreased by 93% in women between the ages of 35 and 64 who were checked 1 to 3 times per year, 84% when screened 5 times per year, and 64% when screened 10 times per year, according to the International Agency for Research on Cancer (IARC).

Hinsellmann first proposed the idea of viewing the cervical epithelium under magnification in 1925. A special technique for examining benign and premalignant lesions is colposcopy. The transformation zone, which is the intersection between the squamous and columnar epithelium, can be seen directly through the cervix using a

colposcope, a binocular microscope used for assessing abnormal pap smears.

The accuracy rate for colposcopy as a whole is 98.3%, with only a few false negatives reported in various trials. The colposcopic examination's sensitivity is 83.6%, and colposcopy and histology correlate very accurately.[5]

Colposcopy, which may be performed in a single visit and is observer dependant, provides quicker results, directs the location of the biopsy, and hence is probably a better screening method for premalignant lesions in symptomatic individuals.

Despite the pap test and colposcopy's debut many years ago, cervical cancer still kills 274,000 Indian women annually and injures 493,000 more.[6] We believe that no screening procedure is yet 100% specific. Therefore, there is room for both reviewing current screening methods and researching newer methods. This is why the current study was designed to compare the effectiveness of colposcopy and pap smear in symptomatic individuals for the detection of premalignant cervix lesions.

Materials and Methods

From September 2022 to February 2023, this study was carried out at the Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, in the departments of obstetrics and gynaecology collaborated with department of pathology.

In this prospective clinical study, 200 sexually active women between the ages of 20 and 60 were recruited. They were assessed for symptoms including abnormal vaginal discharge, backache, abdominal pain, irregular menstrual bleeding, postmenopausal bleeding, and postcoital bleeding. The study excluded women who were known to have genital cancer, cervix premalignant lesions, were pregnant, or had undergone a total hysterectomy.

A thorough history, general examination, and systemic examination were performed after the patients provided their informed consent and received counselling. Data were recorded using a pretested proforma. In addition, a per speculum examination, a pap test, and a pervaginum examination were performed. Colposcopy and cervical biopsies were performed on all of the women.

After performing a dorsal bladder evacuation, a papanicolaou smear was performed. Cusco's speculum for bivalves was first offered without any lubricant. The Ayre's Spatula was used to scrape the ectocervix while rotating it 360 degrees and making sure to completely cover the transformation zone and endocervical brush.

The collected cellular material was swiftly yet delicately spread across two clean glass

slides. The 95% ethyl alcohol served as a fixative, and the glass slides were then immediately placed into a labelled Coplin jar with the patient's name, registration number, and consultant's name. The jar was then given to the pathology department.

The usual Pap method was then used to stain the produced smears. Following staining, the samples were inspected under a light microscope by a pathologist. The smears were cytologically interpreted utilising the Bethesda system 2010.[7]

This study colposcope was made by a reputable manufacturer. After cleansing with normal saline, the cervix was exposed using a self-retaining Cusco's speculum for a colposcopic examination, which was then followed by the administration of 3% acetic acid and Lugol's iodine (Figs. 1 and 2).



Figure 1: Colposcopic image of CIN III lesion with acetowhite area with coarse punctuations

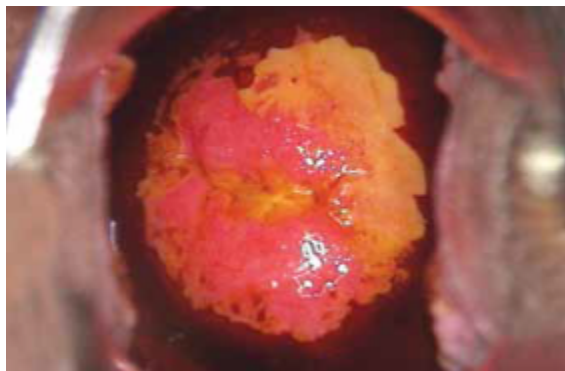


Figure 2: Colposcopic image of CIN III lesion with negative iodine uptake

Noted and recorded are the lesion's border, colour, the presence of blood vessels, and the iodine staining reaction. Reid's score (Table 1) was used to forecast how aberrant colposcopic results would be graded.

Table 1: Reid's colposcopic scoring

	0 point	1 point	2 points
Margin	Condylomatous or micropapillary contour <ul style="list-style-type: none"> • Indistinct AW • Feathered margins • Satellite lesions and AW that extends beyond TZ • Angular lesions 	Regular lesions with smooth straight outlines	<ul style="list-style-type: none"> • Rolled, peeling edges • Internal demarcation between two areas of differing appearance
Color	<ul style="list-style-type: none"> • Shiny, snowwhite • Indistinct AW 	Intermediate grade (shiny grey)	Dull, oyster white
Vessels	Fine-caliber vessels, poorly formed pattern	Absent surface vessels after acetic acid application	Definite punctuation or mosaicism
Iodine staining	Positive iodine staining Minor iodine negativity	Partial iodine negativity	Negative staining of significant lesion
	0-2 = HPV or CIN I	3-5 = CIN I-II	6-8 =CIN II-III

Punch biopsies were performed on the cervix's colposcopic questionable spots, or four quadrant biopsies were performed on cervixes that appeared to be normal and sent for histological analysis. For staining, hematoxylin and eosin was utilised.

Chi-square test statistical analysis was used to determine the sensitivity, specificity, and positive and negative predictive values of colposcopy and pap smear.

Results

In our study, the majority of the women, 126 (63%) were between the ages of 30 and 49, while 42 (21%) were between the ages of 50 and 60. The study's average age was 40.01 ± 9.75 years (Table 2).

Table 2: Age wise distribution of patients

Age in years	No. of cases	Percentage
20-29	32	16.0%
30-39	66	33.0%
40-49	60	30.0%
50-60	42	21.0%
Total	100	100.0%

The majority of the women in our study, 98 (49%) had parities of 3 to 4 and >5, followed by 56 (28%) and only 46 (23%) had parities of 1 to 2. There were no nulliparous women in our study (Table 3).

Table 3: Parity wise distribution of patients

Age in years	No. of cases	Percentage
Nulliparous	0	0
1-2	46	23.0%
3-4	98	49.0%
>5	56	28.0%

Smear was normal in 14 (7%), inflammatory in 88 (44%) and ASCUS in 38 (19%) of the 200 women investigated, followed by LSIL and HSIL in 26 (13%) and 22 (11%) of the women, respectively. Only 4 (2% of the women) had squamous cell carcinoma.

In contrast, out of 102 negative pap smear findings, 90 were true negatives and 12 were false negatives. Of the 98 positive pap smear findings, 48 were true positives and 50 were false positives.

Table 4: Correlation between histopathology and cytology

		Histopathology		
		Positive	Negative	Total
PAP smear	Positive	48	50	98
	Negative	12	90	102
Total		60	140	200

Papanicolaou smear had a positive predictive value of 48.98% and a negative predictive value of 88.24%, with a sensitivity of 80% and specificity of 64.29.

40% of the women who had colposcopy had normal colposcopic results, followed by CIN 1 in 24%, CIN 1-2 in 28%, and CIN 2-3 in 8% of the women.

In our investigation, 60 women (30%) obtained colposcopic and histopathological results that were favourable. In contrast to 60 (30%) women who had positive colposcopic findings but negative histology, 80 (40%) women had normal colposcopy with negative histological results (Table 5).

Table 5: Correlation between histopathology and colposcopy

		Histopathology		
		Positive	Negative	Total
Colposcopy	Positive	60	60	120
	Negative	0	80	80
Total		60	140	200

Colposcopy's sensitivity, specificity, and positive and negative predictive values were 100 and 57.14%, respectively.

Out of the 200 cases who underwent biopsy, 136 (68%) had chronic cervicitis, followed by 36 (18%) and 10 (5%), who had CIN 1. Squamous cell carcinoma was found in 10 (5% of cases), but CIN 3/CIS was present in just 4 (2% of women).

While 32 of the 38 women with positive cytology had negative colposcopy and histological findings, those with negative cytology had positive results (Table 6).

Table 6: Correlation between positivity of cytology with colposcopy and histopathology

		Colposcopy and Histopathology	
		Positive	Negative
Cytology	Positive	22	16
	Negative	38	28

Discussion

Invasive cervical cancer is seen as a preventable disease due to the cervix accessibility, protracted preinvasive state, excellent screening, and treatment of preinvasive state.[8]

Our study's sensitivity of pap smear was somewhat lower than those of Al Alwan *et al* research from 2001 (88.9%), and Maria *et al.* studies from 2009 (91.7%)[10] but was much higher than the 15% reported by Mojgan *et al.* in 2011.[11]

Our study pap smear specificity was almost two thirds that of research by Al Alwan *et al.* (2001) (98.4%), Randomir *et al.* (2005/88%), and Mojgan *et al.* (2011/93%).[11] and it was almost twice as high (34.6%) as just one study by Maria *et al.*[10]

Our study's pap smear had a higher sensitivity than others since we included symptomatic patients with atypical cervixes, making it a good screening approach for cervix lesions.

Our study colposcopy sensitivity was compared to numerous others, including those by Randomir *et al* 2005 (96%)[12], Maria *et al* 2009 (94.4%), Olaniyan B 2002 (87-99%), and Maria *et al* 2009.[10]

The specificity of colposcopy in our investigation was in line with several studies by Olaniyan B. 2002[13] (26-87%), Randomir *et al.* 2005[12] (57%), Maria *et al.* 2009[10] (50%) and Ramesh *et al.* 2012[14] (46.42%).

Colposcopy has a higher sensitivity than a pap smear, but a lower specificity. Inflammation, immature metaplasia, and latent human papilloma virus infections may all contribute to the high incidence of undetected acetowhite epithelium, which may also be the cause of this.[15] Colposcopy's drawbacks include its reliance on observer variability and comparatively subpar ability to distinguish between a normal cervix and low grade lesions.[13]

Conclusion

Colposcopy and guided biopsy appear to be preferable to pap smear for early detection of preinvasive lesions in symptomatic women, according to the findings of our study. Therefore, in resource-constrained nations like ours, using the "single visit approach"—in which cytology, colposcopy, and guided biopsy are all performed in one setting and handled appropriately—will permit maximum utilisation of limited medical resources.

To properly characterise colposcopy use in symptomatic rural women, more study on a larger cohort is required.

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